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ABSTRACT

This manual presents five learning styles instruments and presents data related to validity and reliability and descriptive statistics. The manual also discusses the implications for learning presented by each of these learning models. For purposes of this discussion, "learning style," "cognitive style," and "personal style" are used synonymously. The five models discussed are: (1) the neuro-linguistic programming of J. Childers (1985), as assessed with the Student Learning and Interpreting Modality Instrument and the Learning and Interpreting Modality Instrument; (2) a multidimensional model of learning or cognitive style associated with the work of Piaget, A. Gregorc, and D. Kolb, and assessed with the How I Learn Inventory; (3) an approach to personality type or style based on a Jungian typology, assessed with D. Lemire's Ego Inventory; (4) a personal styles model adapted from the business world as measured by D. Lemire's Creative SELF Inventory; and (5) a decision-making model based on a five-part social learning model called the Judgmental Ability Narrative. An order form is included for the instruments. (Contains 10 figures and 78 references.) (SLD)

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TECHNICAL DATA FOR FIVE LEARNING STYLES INSTRUMENTS WITH INSTRUCTIONAL APPLICATIONS

(Revised 10.31.01)

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CONTENTS:

List of Figures	4
Introduction	5
Background Research on Learning Styles	6
Biological Basis for Learning Styles	7
Section 1: Three Basic Learning Modalities: Visual, Auditory, Hapic	11
Section 2: The How I Learn Inventory (HILI)	17
Section 3: The Ego Inventory	29
Section 4: The Creative SELF Approach to Personal Styles	34
Section 5: JAN – The Judgmental Ability Narrative	44
Conclusions and Recommendations	53
Reference List	57
Order Forms	65

The purpose of this manual is to describe five learning styles instruments; to present data related to validity, reliability and descriptive statistics; and to discuss the implications for learning that each of these models present. Finally, the author presents recommendations for further research.

FIGURES

(1)	Four Dimensions HILI	18
(2)	How Learners Learn Best HILI	21
(3)	Calculations for Average Distributions of Scores (I-IV) HILI	28
(4)	Ego Inventory Statistical Results	32
(5)	Ego Inventory Basic Characteristics	33
(6)	Increasing Style Effectiveness	40
(7)	Statistical Results JAN: Teachers and Administrators	49
(8)	Statistical Results JAN: Mean Scores	50
(9)	Statistical Results JAN: Spring 98 Sample	51
(10)	Creative SELF-Decision-Making Matrix: A Random Process	51

Introduction

The idea of types or styles goes back to the early Greeks (Santrock, 1997; Dunn, Sklar, Beardry, & Bruno, 1990). "As early as 400 BCE Hippocrates classified people's personalities according to their body type" (p. 19). Dunn, Sklar, Beaudry, & Bruno state,

> "Much clinical and experimental evidence demonstrated differential processing in the left and right cerebral hemispheres of humans' intact brains. Their specific contributions to particular cognitive functions are still debated and continue to be the object of scientific investigations." (p. 284)

John Locke, in the 16th century, described three styles (what he called "modes") of perception: intuitive, demonstrative, and sensitive (in Stumpf, 1993, p. 270).

In the early part of this century, Pavlov talked about personality types, (Windholz, 1997; and Wolpe & Plaud, 1997), as did Sheldon (in Santrock, 1997). Probably the most well-known of the type models is Jungian (Enns, 1994; Reiff, 1992; ASTD, 1988). Alfred Adler (in Lundin, 1989 or in Deeks, 1997) discussed four "types" identified "by their level of social interest and also the manner of functioning (in the) way that they choose...in striving toward perfection " (p. 310). In the second half of the 20th century, the idea of types or styles was still popular, especially with regard to schooling, instruction and education (Lemire, 1996). The purpose of the present article is to describe five learning and judgmental style instruments, assemble descriptive and statistical data related to the validity and reliability of these instruments, and discuss the implications of learning styles for the instruction of adults. For the purposes of the present article, we use the terms "learning style," "cognitive style," and "personal style" synonymously. The differences between these three concepts will be the subject of another article.

Some Background to the Research on Learning Styles

The author has been studying learning styles for some time (Lemire, 1986; Lemire, 1996). While there is growing scientific data to support the concept of learning styles, learning styles, cognitive styles, and personal styles are still considerable under-studied. In reviewing the published research on this topic the author found that there are three fundamental problems with learning styles instruments: (1) confusion in definitions, (2) weaknesses in reliability and validity, and (3) the identification of relevant characteristics in instructional settings (in Lemire, 1996). Dunn, Beardry & Klavas summarized the research into learning styles in 1989 (46(6). Ferrell (1983) concluded,

> "Those working with learning styles (s) have proceeded with the development of an increasing number of learning-styles instruments without regard for theoretical framework providing evidence for a learning-styles paradigm that is acceptable to all working in the field. Empirical evidence relating the instruments to each other and to the theory base surrounding the construct (is) needed" (p. 33).

For the purposes of the present article we shall define "learning style" as one of a related group of constructs such as learning style, cognitive style, and personal style, which reflect natural genetic inclinations representative of innate biological origins (deWall, 1996; Garger, 1990). It is true that there are some learning or cultural influences that impact upon style, particularly social roles, but this is a relatively small influence (see Phelps, Davis and Schartz, 1997; Cain & Cain, 1990). Learning styles, cognitive styles and personal styles are more generic concepts than, for example, the "thinking styles" model espoused by Sternberg (1998) and

Sternberg and Grigorenko, (1997). I like the Jungian model, in which "thinking" style is one form of learning style or type.

The Biological Basis for Learning Styles

I see learning style as an extension of personality and personal style or type. Several studies have suggested a biological basis for personality (Tellegen, 1987; Gallagher, 1994; Ellis, 1979; Thomas, Chess & Birch, 1970; Rifkin, 1998; Plomin, 1997; Phelps, Davis & Schartz, 1997) Holden (1987) has stated, "Biology may not be destine, but genes apparently have a far greater influence on human behavior than is commonly thought" (p.18). McCrae and Costa, (1997) have gone so far as to suggest that "these data strongly suggest that personality trait structure is universal" (p. 509). While considerably more evidence is needed to define learning style as solely biologically-based, it does seem clear that we inherit certain tendencies that impact on personality and learning, and one of these groups is learning styles, cognitive styles and personal styles. To be technically correct, it is accurate to say that an interaction of biological factors and social factors produce behavior as represented in the learning styles concept.

In a review of related literature Moszynski (1995) concluded that there was too much focus on the content of curriculum:

> Stark (1986) feels that many authors writing on this topic do not separate the product and process. Schroeder (1993), in an attempt to research learning styles, administered a Myers-Briggs Type Indicator on four thousand students. He found that sixty percent of the first year students preferred sensing, which indicated a preference for direct, concrete experience, moderate to high structure and linear, sequential learning. While Schroeder (1993) only looked at first year

students, other researchers have looked at student development throughout post secondary education. Perry (1970) documented that Harvard undergraduates proceeded through nine stages of intellectual development from simplicity to complexity and from differentiation to integration. Stark (1986) notes that although Perry's methods differed from other researchers, the stages he defined conform closely to changes in students documented by other researchers.

Kolb (1976) developed the Learning Style Inventory based on the theory of experiential learning. The inventory measures four learning modes defined by Kolb as (1) concrete experience (CE), (2) reflective observation (RO), (3) abstract conceptualization (AC) and (4) active experimentation (AE). Since the learning modes are combined, Kolb categorized them into four learning styles. The "converger" uses abstract conceptualization with active experimentation. This common sense learner asks how something works and solves problems by a coaching method. The "assimilator" uses abstract conceptualization with reflective observation. This analytical learner wants to know what the facts are and values sequential thinking. The "diverger" uses concrete experience with reflective observation. This imaginative learner wants to know why material is relevant. Finally, the "accommodator" combines the learning steps of concrete experience and active experimentation. These dynamic learners ask what if? and learn by trial and error, has visions for the future, and learns best in a self-discovery method. Kolb also suggests that a person's professional orientation can shape learning styles. Some of this influence, he posits, comes through professional training, and other influences come from sharing a common set of professional values and beliefs.

> Information on learning styles of students and how the styles change or develop over time has implications for the development of instructional methods by educators. "Individualization of learning lies at the heart of the instructional revolution" (Cross 1976). Cross (1976) feels strongly that colleges need to accommodate different learners. (p. 71).

One of the most well-researched personality typologies is that of Holland (1996), (and in Herr and Cramer, (1996)). Holland's model applies six kinds of personalities or types to occupational interests and choices. Holland's approach, "gives explicit attention to behavioral style or personality type as the major influence in career choice and development." In this sense, Holland's work is part of a long tradition of conceptualizations of individual differences in personality type encompassing such persons as Spranger (1928) and Murray (1938). In other research, York and Tinsley (1986) have related Witkin's cognitive styles model to Holland's model, in an article that discussed the relationship between cognitive styles and Holland's personality types: "The field dependence-field independence continuum represents differences in the way people perceive their environments. The perceptions of field-dependent persons are heavily influenced by the overall environmental context, whereas field-independent persons are better able to isolate a specific part of the environment and to perceive that part independently of the environment as a whole" (p. 535).

The purpose of this manual, then, is to present and discuss five different approaches to the concept of learning and decision-making styles. These five models are:

(1) Childer's neuro-linguistic programming as assessed with the Student Learning and Interpreting Modality Instrument (SLIMI) and the Learning and Interpreting Modality Instrument (LIMI).

(2) A multi-dimensional model of learning or cognitive style associated with such people as Piaget, Gregorc, and Kolb, and assessed with the How I Learn Inventory (HILI).

(3) An approach to personality type or style based on a Jungian typology (most normally associated with the Myers-Briggs Type Inventory (MBTI)), but using Lemire's Ego Inventory.

(4) A personal styles model adapted from the business world (see Merrill, 1981), as measured by Lemire's Creative SELF Inventory.

(5) Finally, a decision-making model based on a five part social learning model called JAN: Judgmental Ability Narrative.

Section 1: Three Basic Learning Modalities: Visual, Auditory, Hapic

The modalities approach to learning styles can be traced back to Childers (1985) in an article entitled, "Neuro-Linguistic Programming: Enhancing Teacher-Student Communications." In his article Childers cites a 1975 book by Bandler and Grinder (Structure of MAGIC I.). Childers stated,

> The NPLP model is designed to facilitate understanding of how people organize their experience, particularly those involving decision-making, creativity, learning and motivation.... An important principle underlying NLP is the people experience that world differently because each person develops a model of the world based on the sensory information received through his or her senses" (p. 33).

In a 1985 article by Bradley and Biedermann these authors also give credit to Bandler and Grinders work, which they then trace back to Husserl's phenomenological philosophy (1985, p. 59).

Earlier Research

The author has been studying and researching learning styles for more than 20 years. Over that period of time some descriptive data have been assembled regarding the percentages of learning style preferences for different groups. This information is presented below:

In 1987 the author gave the Student Learning and Interpreting Inventory (SLIMI) to 27 college students at the University of Wyoming. Sixty-three percent of these students exhibited a clear preference for one of the three basic kinds of learning styles. Fifteen percent exhibited a preference for two of the modalities. Finally, twenty-two percent of these students indicated no clear preference for any of the three basic kinds of learning styles (visual, auditory, haptic). In

addition, fifty-two percent of the students showed a preference for the visual modality; seventeen percent of the students showed a preference for the auditory modality, and thirty-one percent showed a preference for the haptic or kinesthetic-tactile modality.

As a comparison to adults, in 1990, the author gave the SLIMI to 152 eighth graders at a middle school in rural Wyoming. Of these students, thirty-six percent showed a clear preference for the visual modality; sixteen percent showed a preference for the auditory modality; and thirty-two percent showed a preference for the haptic modality. Of these 152 students, thirteen percent showed a mixed preference.

In 1987, the author gave the SLIMI to 142 seventh graders at a middle school in rural Wyoming. Of these students, forty-nine percent indicated a preference for the visual modality, thirty-one percent showed a preference for the auditory modality, and twenty-seven percent showed a preference for the haptic modality. Thirty-four percent of the students showed a preference for two learning styles and seventeen percent indicated no clear preference.

In the spring of 1995, the author gave the SLIMI to a large group of 4^{th}, 5^{th}, 6^{th} and 7^{th} graders in two schools in Topeka, Kansas. The total number of 4^{th} graders was 46 (28 males, 18 females). Of these students, thirty-seven percent indicated a visual preference, thirty percent indicated an auditory preference, and forty-one percent indicated a haptic preference. Of fifty 5^{th} graders tested (25 males, 25 females) thirty percent indicated a visual preference, thirty-two percent indicated an auditory preference, and forty-two percent indicated a haptic preference.

On of the important implications found in this research is the apparent shift of learning styles between childhood and adulthood. Children appear to be balanced in their learning orientation with about one-third being visual, about one-third being auditory, and one-third being haptic. The author gave the Learning and Interpreting Modality Instrument (LIMI) to a large

group of adult students (n = 77). These students were given a total of four instruments, all designed to measure the same learning style preference. Of these students, there were about seventy-five percent congruence between the different instruments (if they scored high on one, they scored high on the other instruments). These students were asked how they saw their own learning styles. About sixty percent of the time their self-perception matched the results of the tests that were given. Of these 77 students, seventy-five percent were visual, six percent were auditory and eighteen percent were haptic.

In a different assessment, the author gave the Swassing Barbe Modality Index to a group of 33 adult college students in the spring of 1995. These results were consistent with those of Stensrud and Stensrud (1983) who studied a group of teachers and found that eighty-four percent had a preferred visual style, ten percent had a preferred auditory style, and 5 percent had a preferred haptic style.

Reliability

In the spring of 1995 the reliability of the LIMI was calculated (both test-retest and split-half). These reliabilities are reported below:

Group 1:	Visual = .76	Group 2:	Visual = .78
	Auditory = .71		Auditory = .68
	Haptic = .77		Haptic = .76

The corrected Spearman-Brown reliabilities for the three subscales are reported below:

Group 1:	Visual = .46	Group 2:	Visual = .39
	Auditory = .15		Auditory = .39
	Haptic = .31		Haptic = .44

The Standard Error of Measurement for Group 1 was V = 2.38, A = 1.74, and H = 2.22.

The Standard Error of Difference at .05 was V = 3.98, A = 4.21, and H = 3.90.

More Results

In a later survey of community college students (Spring, 1998) the Learning and Interpreting Modality Instrument (LIMI) was used to assess the modality preferences of this group. There were 9 males and 41 females (n = 50) in this sample. The results were as follows:

Visual = 62%

Auditory = 5%

Haptic = 36%

Also in the spring of 1985, another group of college students (male = 23, female = 40, n=63) were given the LIMI. The results were as follows.

Visual = 61%

Auditory = 10%

Haptic = 38%

In the spring of 1997 the LIMI was given to a group of high school seniors (male = 11, female = 6, n = 17). Those results ere as follows:

Visual = 41%

Auditory = 18%

Haptic = 47%

Implications for Learning

Table I lists suggestions for instructional strategies and activities that can be used in teaching which utilizes the three basic modalities: visual, auditory, and haptic. The lists are not exhaustive but are meant to suggest instructional alternatives:

Suggested Strategies for Multi-Model Instructions:

VISUAL Seeing	AUDITORY Hearing	HAPTIC Doing
Suggested	Suggested	Suggested
Strategies	Strategies	Strategies
Graphic organizers	tape and read	skits
Read and watch	listen and compare	presentations
Show	tell	do
Guided projects	lecture	board work
Guided notes	singing back	guided notes
Modeling	sing first	posters
Posters	talk and listen	projects
Read instructions first	blindfold	salt and flour projects
Work sheets	Socratic questioning	labs
Chalkboard	audio tape	demonstrations
Pictures	cooperative learning	open-ended investigations
Stick activities	active listening	simulations
Video/tapes	orally summarize	educational games
Instructional TV	compare and contrast	walking
Body language	group work	modules
Smile	dyads/triads	stations
Charting		manipulatives
Collages		group work
Charts		work sheets
Webbing		
Advance organizers		
Written notes		

NOTE: The best instruction will involve some component of all three modalities, (called multi-modal instruction).

The reader is also referred to a source entitled, "Swassing-Barbe Checklist of Observable Modality Strength Characteristics" (Barbe, W. & Swassing, R., 1988) for a detailed list of learner traits.

(Copyright-free samples of instruments such as the Student Learning and Interpreting Modality Instrument (SMILI) are available from the author. Generally, any educator, counselor or psychologist can photocopy Lemire instruments for professional or educational purposes. If you fall into one of these groups, please feel free to copy Lemire instruments as needed.)

Section 2: The How I Learn Inventory (HILI)

Piaget, Gregorc, and Kolb have all identified learning preferences that occur on a continuum form abstract to concrete (Gregorc, 1982; Kolb, 1993; Piaget in Santrock, 1997). In addition, there is an intersecting and interacting continuum which ranges from specific-singular to simultaneous processing (See Figure 1). Besides being intuitively sound, these models have the added advantage of concurrent conceptual validity. Butler, (1984, 1987, 1988a, 1988b) has done considerable work on the educational and instructional implications and practicalities of this kind of four-element model. Gregorc (1979), defines learning style as, "distinctive behaviors which serve as indicators of how a person learns from and adapts to (the) environment. It also gives clues as to how a person's mind operates" (p. 234).

In terms of the HILI, there are three forms of validity to consider: Face validity, construct validity, and concurrent validity. Face validity is the appearance of being a valid test, which the HILI satisfies. Construct validity refers to the test behaving as the construct predicts. Construct validity is also satisfied by the HILI. The third form of validity, concurrent validity, shows that a test correlates with a measure obtained at the same time as the test was administered. We find, as in the case of the HILI, that several researchers have identified and measured the same thing (in this case, a learning continuum ranging from abstract to concrete). While validity is somewhat more difficult to ascertain than reliability, it does seem that there is conceptual convergence for the abstract-concrete domain on this learning styles model.

FIGURE 1

THE FOUR DIMENSIONS OF THE HOW I LEARN INVENTORY (HILI)

The HILI is an assessment of preferred learning style that is based around four dimensions, which are presented below. These four dimensions have been identified by at least four different authors, thus lending credibility to the argument for concurrent validity of the basic concepts identified:

Type I: Specific Sequential (Lemire)
Concrete Sequential (Gregorc-Butler)

Type IV: Specific Simultaneous (L)
Concrete Random (G-B)
Linear
Concrete (Piaget)
Concrete (Kolb)

Type II: General Sequential (L)
Abstract Sequential (G-B)
Formal (Paiget)
Abstract (Paiget)
Abstract (Kolb)
Abstract (Nicholson & Alcorn)

Type III: General Simultaneous (L)
Abstract Random (G-B)
Global (Herr & Cramer, Wechsler Nicholson & Alcorn
Sternberg/Lerner/Lerner)

The four types of learners based on this model are:

Type I: Specific Sequential—needs tangible structure in learning

Type II: General Sequential—needs to know the concept, purpose or rationale: The why?

Type III: General Simultaneous—needs to interact with others as a part of the learning process.

Type IV: Specific Simultaneous—needs creative instruction and opportunities to be creative in learning.

CHARACTERISTICS ASSOCIATED WITH THE FOUR KINDS OF LEARNERS

The Type I Learner

This kind of learner does best with structure. The Type I learner has a well-developed ability to derive information through direct, hands-on experience. This kind of learner exhibits development of the senses. Characteristic terms for this learner include factual, structured, realistic, practical, detailed and hands-on.

The Type II Learner

This kind of learner does best when they understand the concept. The need of this kind of learner is to know "why"?. The Type II learner is characterized by excellent decoding abilities in the areas of written and verbal symbols. Such a learner has many conceptual pictures in the mind against which the person matches what is read, heard, or seen. The Type II learner likes to use reading and listening skills and visual abilities. Possible characteristic terms for this kind of learner are conceptual, logical, analytical, referencing, debating and reading.

The Type III Learner

The Type III learner needs people and learns best in groups. They pay attention to human behavior and have a well-developed sense of intuition when it comes to people. This person is attuned to nuances of atmosphere and mood. This person evaluates the learning experience as a whole. Typical characteristic terms for the Type III learner are personal, relating, flexible, imaginative, and feeling.

The Type IV Learner

The need of the Type IV learner is for innovation and creativity. The Type IV learner has an experimental attitude. These learners get the substance of ideas quickly and demonstrate the ability to make intuitive leaps in exploring unstructured real or creative problem-solving

experiences. They are sometimes questioned for not showing steps or for jumping to conclusions. The teacher may think s/he has a creative way to present material but the Type IV learner has already thought of four more. Characteristic terms for this kind of learner are, divergent, open-ended, investigative, problem-solving, experiential and inventive.

Adapted from Butler, 1988b.

FIGURE 2

TYPE I LEARNERS
WORK BEST WHEN THEY:

-have an orderly, quiet environment

-know the acceptable way of doing things

-have exact directions, example

-can be consistent and efficient

-face limited change in predictable situation

-are given approval for specific work done

-can apply ideas in practical, hands-on , ways

-can answer, "How does this work?"

-trust others to follow through, organized person

TYPE II LEARNERS
WORK BEST WHEN THEY:

-have reading references and expert sources

-are sure of themselves

-follow traditional procedures

-have time to learn material thoroughly

-can work alone

-are respected for intellectual ability

-ask "Why is this?"

-write analytical essays

-rely on lecture notes and written materials

-do library research

TYPE III LEARNERS
WORK BEST WHEN THEY:

-can work and share with others problems

-have assignments requiring interpretation

-get personal attention and emotional support

-have social activities to balance work

-can answer "How can we interpret this?"

-have freedom from control by others

-have a personally satisfying environment

-uses personal, individual or artistic expression

-have open communication with others

-have open noncompetitive atmosphere

TYPE IV LEARNERS
WORK BEST WHEN THEY:

-can try new approaches and solve

-are self-directed

-are competitive

-create their own answers

-ask "How many different ways can I do this?"

-use trial-and-error approaches

-do brainstorming and open-ended activities

-produce real, but imaginative, products

-have options to prove their way works

-have hands-on experiences

Adapted from Butler, K. (1984).

Technical Data for the HILI

The author has assembled some descriptive and reliability data for the HILI model. In a group of male community college students we found seventy-three percent congruence between pre- and post-test scores. (Congruence means that if the scores were "high" on the initial test that they were "high" on the post-test.) The n of this group was 22. In a group of 25 college male students the distribution of the styles were as follows:

Type I = 44%

Type II = 36%

Type III = 4%

Type IV = 32%

The average age for this group was 25 years old.

In a group of 47 college females (average age 28 years) the distribution of styles was:

Type I = 38%

Type II = 32%

Type III = 23%

Type IV = 15%

In a group of 16 college students (mixed gender) the average age was 23 years old. The distribution of styles was:

Type I [illegible]2%

Type II = 5%

Type III = 37%

Type IV = 37%

In a group of 16 males (high school adult) the distribution of scores was:

Type I = 50%

Type II = 25%

Type III = 13%

Type IV = 13%

In a group of 23 college students (mixed gender) the results were as follows:

Type I = m = 33.55 SD = 4.06 r = .78 50% distribution

Type II = m = 32.16 SD = 4.18 r = .78 11% distribution

Type III = m = 31.74 SD = 4.34 r = .68 28% distribution

Type IV = m = 30.23 SD = 4.03 r = .88 11% distribution

This group was given pre- and post-tests. There was a seventy-eight percent congruence between pre- and post-test scores. The statistical results were as follows:

Type I = m = 32.65 SD = 4.95 r = .80

Type II = m = 33.79 SD = 4.18 r = .90

Type III = m = 29.78 SD = 3.11 r = .56

Type IV = m = 29.79 SD = 4.96 r = .46

In another group of 11 college students (adult) there was eighty-two percent congruence between pre- and post-test scores. The statistical results were as follows:

Type I = m = 33.69 SD = 2.83 r = .61

Type II = m = 33.65 SD = 3.82 r = .85

Type III = m = 33.36 SD = 2.24 r = .64

Type IV = m = 29.30 SD = 3.79 r = .87

In a group of college males (n = 25) the distribution of scores were as follows:

Type I = 48%

Type II = 32%

Type III = 4%

Type IV = 32%

For a group of females in the same class (n = 47, college adult) the results were:

Type I = 34%

Type II = 36%

Type III = 26%

Type IV = 15%

The mixed (male and female) distribution of scores for these two groups (n = 72) were:

Type I = 39%

Type II = 35%

Type III = 17%

Type IV = 21%

An interesting comparison can be found if we examine scores of 6th and 7th graders compared to adults. In a group of twenty 7th grade males the distribution of scores were:

Type I = 20%

Type II = 20%

Type III = 20%

Type IV = 55%

In a group of thirteen 7th grade females the distribution of score were as follows:

Type I = 15%

Type II = 23%

Type III = 31%

Type IV = 39%

The average scores of mixed (male and female) 7th grade students were as follows (n = 33):

Type I = 18%

Type II = 21%

Type III = 24%

Type IV = 49%

In a group of 6th grade students (m = 18, f = 24, n = 42) the results were as follows:

Males	Females
Type I = 28%	Type I = 25%
Type II = 28%	Type II = 25%
Type III = 0%	Type III = 13%
Type IV = 56%	Type IV = 50%

The mixed average distribution for these groups of 6th and 7th graders were:

Type I = 26%

Type II = 26%

Type III = 13%

Type IV = 50%

For a group of mixed gender college adults (n = 23) the distribution of scores were as follows:

Type I = 26%

Type II = 49%

Type III = 22%

Type IV = 10%

The average age of this group of students was 26 years old.

For a group of mixed high school adult students (seniors) the results were as follows (n = 16):

Type I = 50%

Type II = 25%

Type III = 13%

Type IV = 13%

For a group of adult college females (n = 47) the distribution of scores were as follows:

Type I = 38%

Type II = 32%

Type III = 23%

Type IV = 15%

The average age of this group of students was 28 years old.

For a group of college males (n = 25, average age 25 years old) the results were as follows:

Type I = 44%

Type II = 35%

Type III = 4%

Type IV = 32%

FIGURE 3

CALCULATED AVERAGE DISTRIBUTION OF SCORES (I-IV) FOR HILI

(ADULT COLLEGE)

		I	II	III	IV	#s
GRP	1	44	36	4	32	25
	2	37	32	23	15	47
	3	32	5	37	37	16
	4	50	25	13	13	16
	5	50	11	28	11	23
	6	48	32	4	32	25
	7	34	36	26	15	47
	8	39	35	17	21	(combination of groups 6 & 7)
	9	26	49	22	10	23
	10	50	25	13	13	16
	11	38	32	23	15	47
	12	44	35	4	32	25
	13	32	5	37	37	19
X GRPS		40%	28%	19%	22%	
		I	II	III	IV	n = 329

Section 3: The Ego Inventory

The Ego Inventory is an instrument developed by this author to assess four basic Jungian types: sensing, intuiting, thinking and feeling. The approach to Jungian typology that most people are familiar with is the Myers-Briggs Type Indicator (MBTI) (Kroeger & Thuesen, 1988). Research on the MBTI is extensive (Hammer, 1996).

> According to the most recent MBTI bibliography published by the Center for Application of Psychological Type (CAPT, 1995), in the decade since publication of the 1985 MBTI Manual, 2, 689 articles have been written about the instrument. This is two and one-half times the articles published in the decade immediately preceding publication of the MBTI Manual. The bibliography now contains 4,192 entries, beginning with an article written in 1957 (p. 1).

Hylton and Hartman (1997) report acceptable levels of reliability for the MTBI:

> Reliability information associated with the MBTI abounds. For example for scores measured on the four bipolar continuous scales of Form G, internal consistency in the form of split-half reliabilities (product-moment correlation coefficients r between randomly comprised halves of a single instrument) for samples similar to ours ranged between .81 and .89, inclusive (Myers & McCaulley, 1985, p. 166). Tzeng, Outcalt, Boyer, War, and Landis (1984) reported alpha coefficients (the average of all possible split-half correlations) between .74 and .85. In here summary, Carlson (1985) cited two reports showing temporal consistency in the form of test-retest coefficients (r; for a five-week interval) ranging between .77 and .89.

Myers and McCaulley (1985) reported validity of a number of sorts. For example, they cited correlations between (a) the E-I, S-N, and T-F scales of the MBTI and (b) the respective scales of the Jungian Type Survey (Wheelwright, Wheelwright, & Buehler, 1964). The latter was developed independently to identify Jungian types and does not assess a J-P dimension, the dimension representing an elaboration of distinctions treated only briefly by Jun (Myers & Myers, 1980). For tow samples, correlations were I-I, .79 and .55; S-N, .58 and.66; and T-F, .60 and .66. More recently, Karesh, Pieper, and Holland (1994) reported correlations between the respective scales of these two instruments ranging between .34 (T-F) and .70 (E-I). Apart from comparisons with other measures of Jungian type, Harvey, Murry, and Stamoulis (1995), Thompson and Borrello (1986), the Tzeng et al. (1884) provided evidence for construct validity of the MBTI by showing that the factor structure of scores for the individual items corresponded very closely to the four independent bipolar-scale of the MBTI. That is, these researchers attempted to determine how many higher-level variables ("dimensions," "factors", " or "principal components") were required to account mathematically for the variation represented by all of the items. They found that, mathematically speaking and in general, individual items seemed each to relate to one of four higher-level variables, corresponding closely to those expected theoretically (E-I, S-N, etc.) by the instrument's creators (p. 98).

However, not all reports on the MBTI are quite so glowing. Pittenger (1993) concluded, "A review of the available literature suggests that there is insufficient evidence to support the tenets of and claims about the utility of the test" (p. 467). One of the problems with the MBTI is

that it presents a model that is too complicated for use, as an example, in a classroom. Pittenger, in the same article, concluded,

> There is insufficient evidence to justify the specific claims made about the MBTI. Although the test does appear to measure several common personality traits, the patterns of data do not suggest that there is reason to believe that there are 16 unique types of personality. Furthermore, there is no convincing evidence to justify that knowledge of type is a reliable or valid predictor of important behavioral considerations. Taken as a whole, the MTBI makes few unique practical or theoretical contributions to the understanding of behavior (p. 483).

In terms of concurrent validity, on of the subscales on the MBTI and the Ego Inventory measures the "thinking" type. Thinking styles is a concept discussed at length by Sternberg (1998b). Yet even Sternberg's model needs scientific research, "It should be stated at the outset that the theory presented in this article is speculative. Because it is new, no hard empirical data have yet been collected to test the theory. It may be a while before even the first set of planned studies is completed, as testing theories of styles is completed, at testing theories of styles is a complicated business requiring careful controls" (Sternberg, 1998b. p. 198).

So, what can a thinking professional conclude about styles and types? Given the conflicting reports on the science of styles or types I would say that the Ego Inventory is just as good as other instruments that are available. The singular advantages to Lemire instruments are: (1) cost, (only the price of copies, and (2) availability, (counselors, teachers, and professional educators can reproduce Lemire instruments without written permission). I have been working to assemble statistical data on this instrument for the past few years. The results of this research are presented in Figure 4.

FIGURE 4

THE EGO INVENTORY RESULTS

College Group Mixed Gender n = 29

Sensation	Intuition	Thinking	Feeling
Mean 30.81	28.24	29.15	30.96
SD 4.77	5.55	5.15	4.02
r .90	.89	.89	.84

College Female n = 14

Sensation	Intuition	Thinking	Feeling
43%	0%	7%	50%

College Male n = 10

Sensation	Intuition	Thinking	Feeling
50%	10%	30%	10%

College Male n = 20

Sensation	Intuition	Thinking	Feeling
65%	25%	0%	25%

College Female n = 32

Sensation	Intuition	Thinking	Feeling
28%	16%	38%	50%

College Male n = 12

Sensation	Intuition	Thinking	Feeling
75%	33%	8%	8%

College Mixed Gender

Sensation	Intuition	Thinking	Feeling
X 29.7	27.1	28.8	29.1
SD 4.3	5.5	4.1	4.9

College Male Sp 97 n = 55

Sensation	Intuition	Thinking	Feeling
56%	25%	19%	31%

College Female Sp 97 n = 55

Sensation	Intuition	Thinking	Feeling
40%	13%	21%	54%

College Mixed Sp 97 n = 55

Sensation	Intuition	Thinking	Feeling
40%	13%	20%	47%

What are the Implications of the Ego Inventory for Adult Learning?

As was indicated earlier in this manual, the MBTI model is too complicated for general use. My model has four basic types: sensing, intuiting, thinking and feeling. Figure 5 presents the basic personality traits associated with our approach to typology. A more in-depth treatment is presented in Kroeger and Thuesen (1988).

FIGURE 5

THE EGO INVENTORY BASIC CHARACTERISTICS

Implications for Learning and Social Interaction

Sensors tend to be:	Intuitors tend to be:
Practical	Interested in new things
Realistic	Imaginative
Observant	Can see possibilities
Learn best from an orderly sequence of details	Interested in the big picture rather than details.
Thinkers tend to be:	Feelers tend to be:
Fair	Sympathetic
Analytical	Accepting
More interested in things and Ideas than people	More interested in people than things
Low interest in harmony	Interested in harmony

In the first part of this article, the author discussed three common approaches to learning styles or types: the LIMI, the HILI, the Ego Inventor. Now I will present two more models: One that deals with personal styles (Creative SELF), and on that deals with judgmental styles (JAN: Judgmental Ability Narrative).

Section 4: The Creative SELF Approach to Personal Styles

The purpose of this section of the article is twofold: (1) to introduce and explain the Creative SELF model of personal learning styles and (2) to describe statistical results from several samples of adult learners. One can also think of learning and personal styles as models of communication. While several such models exist (McManus, 1978; Psychological Associates, 1976; Maynard, 1982; Rookin, 1975; and Hersey & Blanchard, 1982), the Creative SELF model is desirable because of its simplicity and accuracy. The Creative SELF approach is one of the most practical styles models I have found.

The Four Basic Styles or Types

The S or Self-Reliant Style. The S type has a controlling pattern.

> "This style can sometimes appear cool and distant with others. They tent to be precise about the use of their time, and willing to take interpersonal risks. When in their comport zone, they prefer telling others what to do. They combine competitiveness and self-control. They tend to be task-oriented and use few voice changes or gestures" (PDI, 1980, p. 6)

The E or Enthusiastic Style. The E type has in entertaining pattern.

> "This style tends to be verbal, fast-acting, men and women who show their feelings and concern rapidly. They tend to be extroverted, high-risk, people who can become interested in many things and then lose interest in them just as quickly. When in their comfort zone, they prefer to tell others what they feel. They combine competitiveness and self-expression and tend to be people-oriented" (PDI, p. 6).

The L or Loyal Style. The L type has a supporting pattern.

"(People with) this style seems to be more concerned about feelings than facts and are more flexible about the use of time. They prefer low-risk, non-threatening, situations and are people-oriented. When in their comfort zone, they prefer to ask other people what they are feeling. They combine self-expression and cooperation and appear warm and close in their interpersonal relationships" (PDI, p. 6)

The F or Factual Style. The F type has a comprehending pattern.

"This style is usually cooperative, non-verbal, and low-risk taking. They may seem cool and distant as they try to remain precise about the use of time, preferring to work with facts and figures rather than feeling and intuition. They like to have time to study all the facts before making a decision. They combine cooperation and self-control in their interpersonal relationships. When in their comfort zone, they tend to ask others what they are doing" (PDI, p. 6).

Variations In Style: Typical Profiles

The author has indicated that each person has a primary tendency toward a specific style or styles. A tendency is not an absolute standard, which bears repeating. In addition to the primary tendency that each person has, it is important to note the secondary or supporting styles whose INTERACTION, among other things, shapes behavior. There are five typical patterns of styles, which manifest themselves among sample populations:

The Kite
The Megaphone
The Square or Box
The Diamond
The Triangle (in Lemire, 1988)

The Styles and Decision-Making

One of the important tendencies that can predictably be described by the Creative SELF Model is how people make decisions. Each of the four basic styles (S = Self-Sufficient, E = Enthusiastic, L = Loyal, and F = Factual) has a distinctive approach to decision-making. These characteristic approaches to judgment and decision-making have implications for how students complete their work.

The Self-Sufficient style (S) is concerned primarily with product. The S's "perceived need" (Lemire, 1987) is for results. When approaching an S with a potential decision, the S first needs to understand the "Big Picture". It is important to consider global implications (in terms of the Big Picture, not necessarily the world in a literal sense). It s also important to use graphics and right-brain instructional methodology, as intuition will play an important part in the decision-making of both the S and E styles. With an S it is important to make a good First Impression (FI). The S style can make up his/her mind quickly.

The Enthusiastic style (E) is concerned primarily with process. The E style needs process time. Optimal decision-making means giving an E plenty of time to TALK ABOUT the potential decision. The E will deal freely with feeling issues. Consider carefully what the feeling implications are for the potential decision (PD). How will the E be influenced personally by a given decision? E types need expression and feeling feedback.

The Loyal (L) style is concerned primarily with company. The L styles must be considered in a personal context. Discussion of issues should take place in a personal interchange for optimum results. It is not generally wise to send memos or letters to L's, since L's will want other people there to talk about things (memos and letters can be used for follow-up or documentation, but a phone call would be better for the L style). The more personal the

interaction the better (from the point of view of an L). In addition, an L's opinion must be drawn out, which will take time (because the L's tend to listen, rather than talk). So extra time must be taken with L's in order to insure that everyone is included in the decision-making process. L's need committees and task forces (so everyone can be involved). For L's, results are not nearly as important as involvement

The Factual (F) style is primarily concerned with detail. F's need to be inundated with facts and figures. There must be a full and complete discussion of issues and consequences. If the F's are unusually intelligent, there will always be one more issue, consequence, or detail to be considered in full. Much time will have to be allocated for such detailed consideration. Thus, it is important to set long timelines allowing for careful considerations of all the permutations. With an F, use left-brain instructional methods. F's need detail and comprehension. Give F's lists (which are in sequential order) and linear charts (as opposed to the graphs given to S's and E's).

There are a number of additional specific tendencies that can be associated with each of the styles that will influence decision-making considerations. These behavioral tendencies can be considered predispositions that must be compensated for in optimal decision-making situations:

Danger: The S style may rush to a decision, and leave the L's and F's feeling ignored. This rush may create a feeling of resentment on the part of the L's and F's which, in the long run, inhibits performance and cooperation.

Danger: The E style may never focus toward the product. In the case of a decision-making situation, with an E one would tend to be left asking, "What am I supposed to do next?"

Since E's are primarily concerned with process, it is difficult for them to narrow their efforts toward completion. With an E the rule is "Out of sight, out of mind."

Danger: The L style will wear others out because of the unending need they have for inclusion. While this inclusion need is fine for other L types S's, E's and F's can find the L need for inclusion frustrating. For L's the product IS inclusion.

Danger: The F style may never make up his/her mind. The F's have the tendency to quibble others to death over functionally inconsequential details. While attention to detail is important, it is not of overriding importance to the other styles (for example, S's look for the Big Picture). F's have difficulty getting on with the job in a timely manner.

Thus, it does seem clear that each of the styles have both strengths and weaknesses. In a decision-making situation, it is important to be aware of BOTH strengths and weaknesses. The critical elements that make the decision-making situation effective, besides awareness of personal style tendencies, are TRUST and RESPECT. If trust and respect are present, then each style can deal openly and honestly with both strengths and weaknesses. There is a simple, four-step, process the author will suggest where people want to be more effective with others. This four-step process will be discussed later in this paper.

Increasing Decision-Making Effectiveness

It will not be within the scope of this paper to discuss the decision-making process in great detail. The reader is referred to other sources (Krumboltz, 1977; Lemire, 1987a) for more specific information on the kinds of decision-making styles. This section will be devoted to improving personal decision-making effectiveness based upon an understanding of the SELF styles. Each of the four personal styles that have been described is associated with predictable

strengths and weaknesses, as has been indicated. To summarize the most essential elements of each of the four styles the reader should remember that:

The S gets things done; focuses on a product, and takes charge.

The E is creative, entertaining, charming, and fun to be with.

The L is sensitive, understanding, and makes sure that everyone gets included.

The F tracks details will; looks for the complete picture, and makes sure that all the pieces are in place.

As with any human behavior, there are negative elements associated with each style. These negative elements can be summarized in the following ways:

Self-reliants NEED TO DEVELOP increased patience, improved human relations skills, teamness and a sense of cooperation, the ability to compromise, and long-range planning skills.

Enthusiastics NEED TO DEVELOP attention to detail, listening skills, practical approaches to getting things done, an ability to establish realistic deadlines, and a productive task orientation.

Loyals NEED TO DEVELOP emotional control, action-oriented tendencies, risk-taking ability, more objectivity, and critical thinking skills.

Factuals NEED TO DEVELOP more sensitivity to feelings (especially if they are men), greater flexibility, an appreciation of others that is expressed, verbalization skills, and more willingness to participate with others. See Figure 7.

FIGURE 6

INCREASING STYLE EFFECTIVENESS

S SELF-RELIANTS
NEED TO DEVELOP:

Increased patience
Human Relations skills
Team cooperation
The ability to compromise
Long-range planning

E ENTHUSIASTICS
NEED TO DEVELOP:

Attention to detail
Listening skills
Practical approaches
Realistic Deadlines
Task orientation

L LOYALS
NEED TO DEVELOP:

Emotional control
Action-oriented tendencies
Risk-taking ability
More objectivity
Critical thinking

F FACTUALS
NEED TO DEVELOP:

Sensitivity to feelings
Flexibility
Appreciation of others
Verbalization skills
Participation with others

Adapted from PDI, 1980

The Versatility Dimension

While each style can be associated with predictable kinds of behaviors, the dimension of versatility is an important consideration when discussing interpersonal effectiveness. Merrill & Reid (1981), described the versatility (Dalton, 1998) dimension in the following way:

> We call the ability to handle our behavioral preferences in (a) skilled way versatility....Statistical research demonstrates that people who are seen by others as highly versatile in interpersonal situations can be found along all ranges of the assertiveness and responsiveness scales, as can those people who are seen as less versatile. What separates the versatile from the non-versatile is the amount of endorsement that they receive from others regardless of style. (p. 88).

Thus, versatility is a trait which can be developed and should be worked for by the person desiring to be optimally effective in decision-making situations. Versatility can be developed with practice and mental rehearsal. The Creative SELF Companion (Lemire, 1988), is one way to learn versatility skills. The author suggest that the greater the versatility of the individual, the greater will be his/her problem-solving ability (see also Lemire, 1987a).

A Simple, Four-Step, Problem Solving Process

In other papers (Lemire, 1987b; 1987c) this author has discussed the issue of problem-solving and a conceptual model of problem-solving that ranges from the least relevant kind of problem-solving (math problem-solving) to the most relevant kind of problem-solving (real or applied problem-solving). The four-step model of problem-solving presented in this paper is a form of real or applied problem-solving (RAPS). Once a person has established a high knowledge base about the four personal styles, a four-step approach to problem solving can be

applied to reduce conflict and increase productivity and cooperation. The four-step process can be summarized in the following way:

Step One: STOP AND THINK. What style is the other person? What is the other person's secondary style? What personal attributes does the person that that influence the present situation?

Step Two: CONSIDER. Am I making the situation or problem better or worse?

Step Three: ASK "WHAT?" What can I do the make the decision-making situation more productive or to solve the problem at hand?

Step Four: ASK "HOW?" How can I help the other person to understand me and what decision I am trying to make? How can I help the other person solve the problem? (NOTE: This four-step process ONLY works on problems where there is agreement to solve the problem. In situations where a conflict of values exists, agreement is much more difficult. See Lemire, (1987b and Lemire & Harris, 1983).

The Percentages of Styles in Adults

A Creative SELF instrument and cover letter were sent to 94 State Senators and State Representatives in Wyoming. Of the 94 questionnaires sent out, 44 were returned completed. Of the 44 instruments returned, the author found the following percentages of styles:

Self-sufficients = 32% Loyals = 41%

Enthusiastics = 14% Factual = 12%

In two other administrations of the Creative SELF instrument, the following percentages were found:

	S	E	L	F
GRADUATE CLASS OF SCHOOL ADMINISTRATIORS:	27%	19%	43%	11%
UNDERGRADUATE EDUCATION CLASS:	20%	14%	54%	15%

Statistical Results and Descriptive Statistics

College sample (mixed gender) n = 30

Test-Retest Congruence = 66%

College Sample (male) n = 10

S = 0% E = 10% L = 40% F = 70%

College Sample (female) n = 28

S = 21% E = 18% L = 18% F = 43%

Conclusion: Creative SELF Model

The purpose of this section has been to describe the Creative SELF model of styles or types. This model is on that was developed in business and industry and has been modified by this author to be useful in educational settings. The next section will deal with judgmental style and present information related to the JAN: Judgmental Ability Narrative.

Section 5: JAN—The Judgmental Ability Narrative

There is no way of exchanging knowledge that does not require an act of judgment.--Jacob Bronowski

This section is concerned with a description of, and statistical data for, the Judgmental Ability Narrative (JAN) developed by the author, and formulated from research conducted at Stanford University (Krumboltz, 1977). While there seems to be much interest in the professional literature on decision-making (Young and Frey, 1985; Janis & Wheeler, 1978; Kimes & Troth, 1974), much of this data seems to concern career decision-making (Winefordner, 1978; Crites, 1978). The career decision-making model is summarized by Humel and Humes, (1984). This article is concerned with what is called "evaluative thinking." The essence of evaluative thinking appears to be individual or group judgment and the facts which influence judgmental outcomes (Stumpf & Zand, 1981; Virts, 1984).

The Judgmental Ability Narrative used in this study was designed to assess five basic kinds of judgment or decision-making styles. A pnemonic device which helps in remembering the five styles is DRIFT: D (dependent), R (rational), I (impulsive), F (fatalistic), and T (intuition, called T-intuition). Each of these judgmental styles are described as:

The Dependent Judgmental Style

A dependent decision-maker relies to a great degree on the opinion of others in order to validate his/her decisions. An example of this would be the adolescent who waits to see what other kids do before a judgment is made.

The Rational Judgment Style

A rational decision-maker tends to be conscious, systematic, and objective in his/her decision-making. The rational decision-maker generally utilizes four basic decision-making

steps: (1) accurately perceiving the situation, (2) combining these perceptions with other information, (3) making individual decisions which are consistent with clear goals and purposes, and (4) feeling confidence or courage to implement decisions, (Lemire and Cox, 1987).

The Impulsive Judgmental Style

The impulsive decision-maker is overly emotional and non-rational. The impulsive decision-maker does things on the spur of the moment, like eating a second helping of desert or an extra donut at breakfast. (Please not that impulsiveness is NOT spontaneity, which is a characteristic of the intuitive judgmental style.) Impulsive decision-makers have a tendency to be driven by excessive internal forces which, in effect, control the person and their judgmental ability. These internal forces also tend to produce negative, rather than positive, feelings and results. Examples of negative feeling and results would be, in the cases previously mentioned, excessive feelings of guilt and an overweight condition because of eating too much.

The Fatalistic Judgmental Style

The fatalistic decision-maker believes that s/he has little or no control over the events that happen in life. Fatalistic students, for example, do not believe that there is a direct relationship between their school work and their grades. Fatalistic teachers would believe that no significant changes be made in the public educational system.

The Intuitive Judgmental Style (T)

An intuitive decision-maker relies to a great degree on sensing and awareness's which are not conscious. These subliminal processes may not be conscious but are really correct for the individual. Intuition is sometimes referred to as an "inner voice." Highly creative people tend to utilize intuition in making decisions. Intuition is also referred to as "metacognition.."

The Judgmental Ability Narrative itself is a 75 item, self-scored survey instrument, which takes about 20-30 minutes to complete. As a subject-scored instrument, the individuals who take it received immediate feedback about their judgmental styles. The subjects also receive immediate suggestions about ways to strengthen weak or deficient judgmental styles. Generally, the R (rational) and T (intuitive) judgment styles are considered to be positive. The other three styles: D (dependent), I (impulsive), and F (fatalistic) are considered to be problematic or deficiency-oriented. Generally, it is recommended to examine the R (rational) and T (intuitive) judgmental styles in tandem, consistent with the principle of whole brain thinking identified by such authors as Levy (1985) and Samples (1975).

Five "Correctives" or ways to deal with or strengthen judgmental styles are present among the pages of the JAN instrument. For the Dependent Judgmental Style, it is recommended that the student:

(1) Make small decisions independently.

(2) Do not punish him/herself with guilt when an error is made.

(3) Making decisions can be scary. Be courageous anyway.

(4) Formulate a realistic and achievable plan to implement decisions.

(5) Identify a rational decision-maker to utilize as a model.

For the Rational Judgmental Style, it is recommended that the individual:

(1) Be more spontaneous.

(2) Do not take too long to make decisions.

(3) Identify priorities and stick to them.

(4) Be sensitive to internal states and feelings.

(5) Strengthen decisions by listening to ones intuition.

For the Impulsive Judgmental Style, it is recommended that the individual:

(1) Think first.

(2) Wait a reasonable and measured period of time.

(3) Consider the consequences of a decision.

(4) Get at least on other opinion about the potential decision.

(5) Do what is best, rather than what strikes his/her mood.

For the Fatalistic Judgmental Style, it is recommended that the individual:

(1) Make plans even if they do not think it makes a difference.

(2) Identify small, realistic steps toward accomplishing their goals.

(3) Identify alternate accomplishable goals and objectives.

(4) Do, rather than hope.

(5) Ask a Rational or Intuitive decision-maker what s/he thinks.

For the Intuitive Judgmental Style (T-intuition), it is recommended that the individual:

(1) Be more rational and objective about decisions.

(2) Secure other opinions more objective than their own.

(3) Be spontaneous but not impulsive.

(4) Consider the real consequences of intuitive decisions.

(5) Be more sensitive to external factors influencing decision.

Results

The results of one survey are based on the reports of 60 educational decision-makers. There were two groups of educators in that survey: one group of 28 experienced and potential school administrators, and one group of 22 elementary, middle, and high school teachers.

Administrators and teachers were selected for this study because they are professional decision-makers. In the words of Good and Brophy (1984):

> To the extent that teachers can become aware of what happens in the classroom and can monitor accurately their personal behavior and that of their students, they can function at decision-making (underlining added). To the extent that teachers cannot do this, they will be controlled by classroom events. When teachers fail to coordinate classroom events, progress is not optimal for students.

The results of this survey are present in Figure 7. Mean scores and Standard Deviations for some of the decision-making styles are presented. In both groups of educators, the Rational and Intuitive decision-making styles have the highest mean scores.

FIGURE 7

GROUP A

Real and Potential School Administrators

	D	R	I	F	T
Number	38	38	38	38	38
Total	239.000	507.000	221.000	90.000	444.000
Mean	6.289	13.343	5.816	2.368	11.684
S.D.	3.463	1.835	3.328	1.584	2.372
Low	.000	8.000	1.000	.000	5.000
High	12.000	15.000	14.000	8.000	15.000

GROUP B

School Teachers

	D	R	I	F	T
Number	23	23	23	23	23
Total	151.000	301.000	189.000	60.000	269.000
Mean	6.565	13.087	8.2176	2.870	11.696
S.D.	3.527	1.756	4.199	1.687	2.704
Low	2.000	10.000	1.000	.000	6.000
High	13.000	15.000	14.000	7.000	15.000

FIGURE 8

JAN: JUDGMENTAL ABILITY NARRATIVE

Dave Lemire

Mean Scores for Populations

College Female n = 18

D = 7 R = 12 I = 16 F = 3 T = 11

College Adult n = 9

D = 6 R = 13 I = 7 F = 5 T = 12

High School Seniors n = 17

Male

D = 5 R = 11 I = 11 F = 4 T = 12

Female

D = 5 R = 12 I = 9 F = 5 T = 10

College Female n = 31

D = 6 R = 13 I = 8 F = 4 T = 12

College Female n = 27

D = 6 R = 14 I = 7 F = 4 T = 11

College Males n = 19

D = 7 R = 14 I = 9 F = 4 T = 11

Mean Scores n = 121

X = 6.4 12.7 8.1 4 11.3

FIGURE 9

JAN: JUDGMENTAL ABILITY NARRATIVE

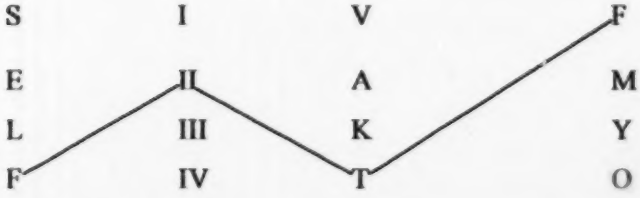
Subscale D:	X = 7.3	SD = 3.9	r. = 89
Subscale R:	X = 13.2	SD = 2.4	r. = 81
Subscale I:	X = 6.9	SD = 4.6	r. = .89
Subscale F:	X = 3.6	SD = 32.7	r. = .83
Subscale T:	X = 11.2	SD = 2.5	r. = .60

N = 156 (Spring 1989 MIXED GENDER)

FIGURE 10

CREATIVE SELF DECISION MAKING MATRIX (DM^2)

Personal Style Learning Style/ Processing Style			Birth Order	Compensation Factors
S	I	V	F	Alcoholism
				Drug Addiction
E	II	A	M	Religion
L	III	K	Y	Neglect
F	IV	T	O	Abuse
				Gender



Choice Process:

S----------O----------R

THESE INTERACTION RELATIONSHIPS ARE NONLINEAR.

STIMULUS—ORGANISM—RESPONSE

INTERNAL FACTORS EXTERNAL FACTORS

DECISIONS always result form the interaction of the above-listed factors on the individuals PERCEPTON of reality (called biased apperception or private logic).

Learning Styles and Types: An Interaction

While the styles and types approach to understanding learning is based in biological predispositions and innate natural tendencies, human behavior is the result of an interaction between genetic and social factors. It is also important to remember that this interaction is a random process, not a linear one. The interaction that occurs, which results in a person's behavior, may have an entirely different effect on another person. So when it comes to styles, I am making generalizations that apply to groups and must be carefully applied at an individual level.

Conclusions and Recommendations for Further Research

The purpose of this has been to discuss concepts and data associated with five learning style or type instruments. The five models were: (1) the neurolinguistic programming model represented by the LIMI (Learning and Interpreting Modality Instrument, (2) a four part model represented by the HILI (How I Learn Inventory), (3) A Jungian model represent by The Ego Inventory, (4) a personal styles model represented by the Creative SELF Instrument, and (5) an assessment of judgmental style represented by the JAN (Judgmental Ability Narrative). Following are instructional issues and suggestions for further research, which is needed to develop and validate the learning styles/types concept.

Instructional Issues

There are a number of important instructional issues that are raised by the data assembled to date. There are five basic instructional concepts that need to be understood in regards to learning style and teaching style issues. These issues are summarized in the MAVIS Model: match, adaptability, versatility, interaction and stretch.

Style Skills: MAVIS

When utilizing teaching or learning styles information during instruction it is important to remember that grouping is often misused to pigeonhole or stereotype people. There are five essential additional considerations that relate to styles and positive labeling:

(1) MATCH. When grouping for instruction the more style match the better. That is, be cognizant of teacher style and student style or student style and student style. The closer the style match the more the learners will have in common. For example, Concrete Seqentials who teach other Concrete Sequentials or Factuals who teach other Factuals.

(2) ADAPTABILITY. The more adaptability the better. That is, the more an individual is not afraid of other styles and is willing to adapt to other styles the better. For example, a Concrete Sequential who will choose to learn from an Abstract Random.

(3) VERSATILITY. Versatility is the fluid ability to shift from one style into others. Versatility is a critical skill that should be taught deliberately along with general style information. For example, a Self-Sufficient who can think like a Loyal.

(4) INTERACTION. No one thing determines behavior. What normally determines behavior for most people is an interaction of influences that result in some kind of decision. So the different style models do NOT overlap, though they do INTERACT to result in behavior. Behavior is not determined by outside forces though it is shaped by outside forces. "Whether you thing you can or not your are right".

(5) STRETCH. The more stretch the better. All students should experience learning in a non-dominant style area. That is, randoms should have to experience sequentialness. The sequentials should have to experience randomness. It is not wise to teach only in a strength area. How will students learn to appreciate other styles if they are only taught in their dominant styles? Generally speaking, since half world is analytical processes and half are global processes, then a rule of thumb is half of a teacher's instructional time should be spent in analytical instruction and half in global instruction.

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Potential Sources of Variance

The approximate average reliability of Lemire scales is about .85+-. What explains the leftover variance in scores? There appear to be at least 12 factors:

(1) arithmetic errors in scoring,

(2) low intelligence in the test taker,

(3) not understanding the questions,

(4) not understanding the concept of the questions,

(5) self-denial,

(6) self-confusion,

(7) lack of integration between real self and ideal self,

(8) faking,

(9) resistance to the concept,

(10) lack of self-knowledge,

(11) an interaction of more than one style preferences, and

(12) some combination of these factors.

Following are 11 suggestions for future research:

(1) More research is needed into style preferences of different age groups (Learning Styles appear to change over time).

(2) More research is needed on non-college adult populations.

(3) More research is needed on the Learning Styles of racial and ethnic groups.

(4) More research is needed on the differences between males and females.

(5) More psychometric data is needed on all groups (mean, sd, %).

(6) More research is needed on validity/reliability of instruments.

(7) More research is needed in the area of conceptual overlap among instruments.

(8) More research is needed on measured differences between children (under age 16) and adults.

(9) More research is needed on how to integrate Learning Styles information into teaching and instruction.

(10) More work is needed in the area of semantic clarification of terms (learning styles, cognitive styles, personal styles).

(11) More work is needed on how to encourage action research using Learning Styles concepts in public school and college/university classrooms.

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